

ASTM A193 Grade B8R (Nitronic 50 / XM-19) — Material Data Sheet

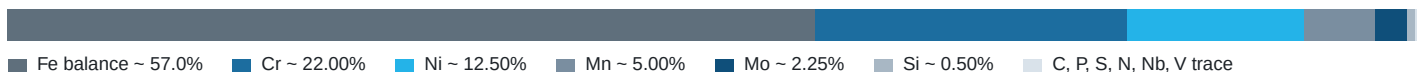
ASTM A193 / ASME SA-193 · UNS S20910 · XM-19 (Nitronic® 50)

Nitrogen-strengthened austenitic stainless steel, carbide solution treated

Nitronic 50 bolting — twice the yield strength of 316 with better seawater corrosion resistance and no loss of ductility, non-magnetic even after cold work.

TENSILE, CLASS 1C / 1D	100 ksi min	HEAT TREATMENT	Carbide solution treated
YIELD	55 ksi min	COMPANION NUT	ASTM A194 8R
HARDNESS	271 HBW / 28 HRC max	MAGNETIC	No, even after cold work

Nominal composition



Midpoints of the specification ranges, for orientation only. Limits are in the table.

Chemical composition — ASTM A193 B8R (XM-19 / Nitronic 50, UNS S20910)

Element	Symbol	Min %	Max %
Carbon	C	—	0.06
Manganese	Mn	4.0	6.0
Phosphorus	P	—	0.045
Sulfur	S	—	0.030
Silicon	Si	—	1.00
Chromium	Cr	20.5	23.5
Nickel	Ni	11.5	13.5
Molybdenum	Mo	1.50	3.00
Nitrogen	N	0.20	0.40
Niobium (columbium)	Nb	0.10	0.30
Vanadium	V	0.10	0.30

Values per ASTM A193/A193M-24, Tables 1 and 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Physical properties (typical)

DENSITY	0.285 lb/in ³ (7.88 g/cm ³)
MODULUS OF ELASTICITY	28.5 × 10 ⁶ psi (196 GPa)
MAGNETIC	No — remains non-magnetic after cold work

Heat treatment

Class 1C: carbide solution treated bar, wire and finished components (clause 6.2.2). Class 1C B8RA: solution treated in the finished condition (clause 6.2.4). Class 1D: bar or wire cooled rapidly from above 1750 °F immediately after hot working, without a separate solution treatment; Class 1D is restricted to service below 850 °F and applies only to bar and to components machined from it without further hot or cold work (clause 6.2.3).

Mechanical properties — ASTM A193 B8R

Nominal diameter (in.)	Tensile strength, min (ksi)	Yield strength 0.2% offset, min (ksi)	Elongation in 4D, min (%)	Reduction of area, min (%)	Hardness, max
Class 1C and 1D — all diameters	100	55	35	55	271 HBW / 28 HRC

Values per ASTM A193/A193M-24, Tables 1 and 2 (verified against the specification). Confirm the edition called out on your purchase order with our estimating team.

Applicable standards

ASTM A193 / ASME SA-193	Alloy-steel and stainless steel bolting for high-temperature or high-pressure service
ASTM A194 GRADE 8R	Companion XM-19 nuts
ASTM A276 / A479	XM-19 bar stock
ASTM F593 / F594	Stainless fasteners (alloy group 7)
NACE MR0175 / ISO 15156	S20910 is listed for sour service within its limits

Forms we supply in A193 B8R

- Full-thread studs and stud bolts
- Double-end and tap-end studs
- Hex and heavy hex bolts
- Socket head cap screws
- Threaded rod (cut and rolled thread)
- Machined components from certified bar

Typical applications

- Naval and marine hardware, shafting and propulsion bolting
- Seawater pumps, valves and desalination equipment
- Sour and chloride process service
- Cryogenic and LNG equipment
- Nuclear and power plant components
- Non-magnetic instrumentation and MRI-adjacent hardware